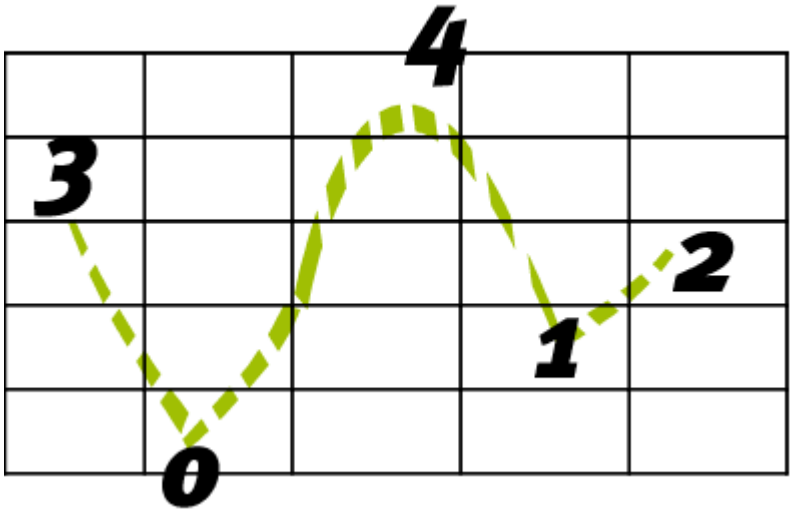
Strategic Energy Management



A SELF ASSESSMENT TOOL

U.S. Dept. of Energy

Rebuild Massachusetts

Acknowledgements

This booklet was prepared
under the direction of Rebuild Massachusetts Program representative, Eileen McHugh.

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DOER would like to thank John Snell at the Peregrine Energy Group
for his contribution to the development of this booklet.

Production and editorial assistance coordinated by Karin Pisiewski and Stan Wesolowski.

Introduction

How to Use this Handbook

Don't know how to start managing your energy? Where to start to first? How long it should take? This booklet provides tools to evaluate the current status of your energy management priorities & grade your energy performance and templates to help develop a budget and a timeline that can be modified to correspond to local needs.

An Energy Management Program helps to control energy consumption. An energy management program can help organizations use only the energy that is really needed, use it efficiently, reduce waste, decrease emissions, maintain good working air quality and thermal conditions, and reduce unnecessary energy costs. From an environmental perspective a good program is usually the most cost effective strategy to reduce outdoor exhaust emissions associated with building mechanical system combustion and electricity consumption. From a fiscal perspective good energy management helps stretch limited financial resources to pay for necessary building capital improvements, salaries, and other necessary expenses. From a public health perspective good energy management improves indoor environmental air quality and provides superior heating and air conditioning thermal comfort

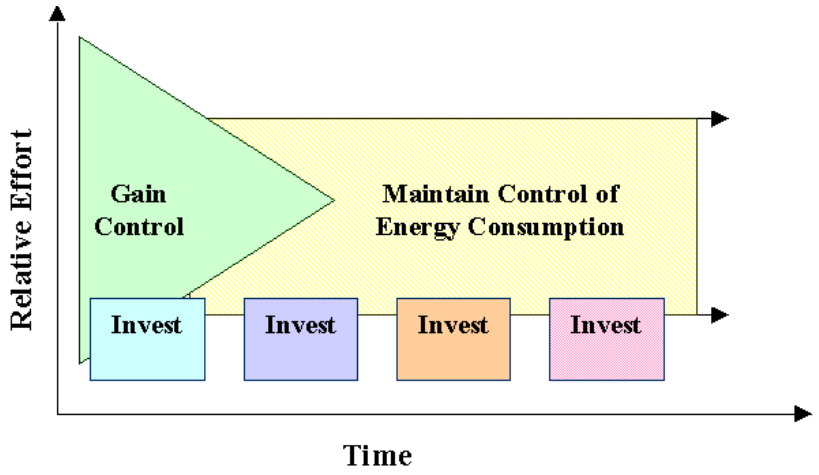
Successful energy management incorporates a commitment to achieve pre-established energy efficiency goals, systematic energy use measurement, and clear communication of the program's success. The amount saved through energy management depends on many things: the design and age of a building, how heavily it is used, the availability of alternate fuels, the amount of capital available to invest, and whether conservation programs are already in place. More often then not, however, conscientious review and management of how a building operates produces savings.

Launching a successful program requires organization. It is important to get support from the chief executive or administrator to the basic objective of having an effective, ongoing program. This support means active involvement: attending key meetings, designating and working with an energy manager and team, and allocating required staff time, resources, and energy consumption accountability. It means providing or actively seeking the financial resources needed for capital improvements such as new lighting or HVAC equipment. Additionally, it means helping to answer any questions arising with staff or other users of the building in relation to needed changes in thermostat settings, lighting levels, or other energy-related conditions.

This booklet provides several tools to assist organizations in prioritizing their energy management goals.

Thinking Strategically about Energy Management Planning[1]

Has your organization initiated an energy management plan? Has it been integrated throughtout the energy management process? Is the performance continually monitored, improved, and maintained? Accountability for results, establishment of meaningful measures and goals, a commitment to regular review, and the endorsement of senior leadership are all critical ingredients for an effective energy management program. Common characteristics of effective energy managing organizations include commitment and leadership (a "champion"), a broad awareness of the benefits, the integration of energy planning into the overall management structure, short and long term plans for managing energy and the collection and utilization of information to manage energy use.



The framework for energy planning includes an appreciation for the strategic phases of energy management. It is useful to think of energy management as a three-phase process within which the effort and resources expended on gaining control of energy use, maintaining control as a continuos business process, and investing in measures to improve energy performance, vary over time.

Gaining Control: Energy is a key component of building operating costs. Early actions focus on gaining control of energy use. The first step is finding out how much energy is used. Determining how to reduce energy consumption requires some "base line" information to understand where things stand and what measures can help reduce energy use. Compare current energy use to historical use and with similar buildings to evaluate the current position. If possible, examine when energy is used. Create an energy use profile on daily, weekly, monthly, and/or annualy. Take an inventory of energy consuming systems to find out where energy is used. Where is energy used? Familiarize yourself with how energy is purchased including the rate structure and unit and incremental costs of various sources.

Maintaining Control: The effort involved in gaining control of energy use diminishes with time. Developing processes helps ensure that control is maintained in the long term. For example, an energy performance information system is an action taken in the "gain control" phase that is instrumental in maintaining control.

Investing: Investments are usually for specific tasks with a limited timeline. Investments may be technical in nature or not: staff training is an example of a non-technical investment.

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[1] Portions of this paper are reprinted with permission from the Canadian Institute for Energy Training.

The Energy Management Matrix

Understanding current status helps identify opportunities to improve energy performance and gain financial benefits. Well-stated goals guide daily decision-making and are the basis for tracking and measuring progress. Communicating and posting goals can encourage support for energy management efforts throughout the organization.

How do you assess your current performance and set goals? The self assessment tool is a simple method that helps organizations assess the present status of their energy management proficiency, set priorities, and measure progress. This is achieved using performance matrices, which allow the user to establish the current position of their organization with respect to a range of energy management issues and to identify which areas need improvement. This tool can be used in conjunction with DOER's Energy Management Basics for Municipal and State Planners and Managers.

The self-assessment tool defines a three-level array of competency matrices to both describe and rank the organization in four key areas:

- Energy management practices
- Financial management practices related to energy management
- Awareness and information
- Technical aspects of energy management

A **first level matrix** summarizes the scores for the performance revealed in four second-level matrices, one for each of the areas listed above.

At the **second level** are four organizational matrices covering the key areas of energy management, finance, awareness, and technical issues.

Finally, a set of **third level**, more detailed matrices is provided, each covering different service functions – heating, lighting, etc. These can be used to support other matrices, particularly the technical matrix, and will be particularly useful in identifying specific opportunities for improvement.

The Energy Management Matrix and those for the other three organizational areas may be used for the assessment of organizational preparedness for energy management, and the identification and prioritization of actions to develop the necessary organizational competencies. Organizational "competency profiles" are defined by the selection of the cells in the matrix that best describe the current status of the organization on each element.

GRADING PERFORMANCE

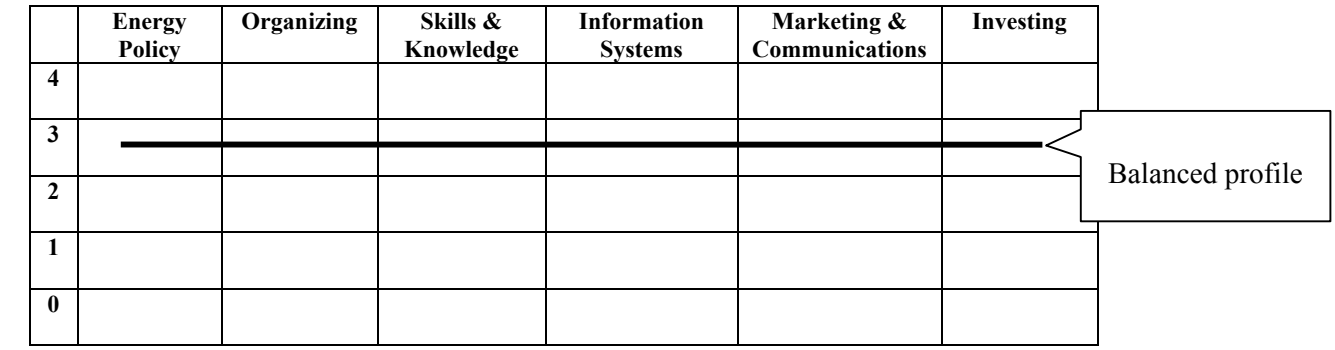
In reviewing ways to help public schools in Florida track their energy use and conserve, a consortium of public and private entities came up with an novel solution that can be used nationwide: Utility report cards (URCs). Orange County (Florida) Public Schools (OCPS) is currently using this Web-based energy information system to track and graph monthly utility bills in a fun and educational program that will save the school district money and conserve energy.

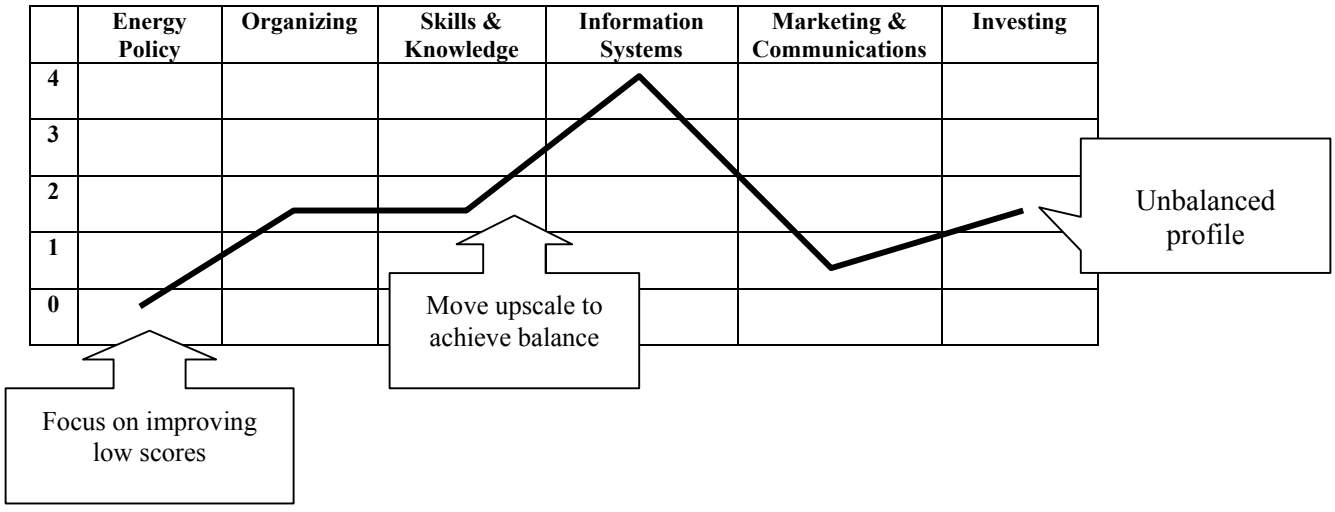
There are three principles that apply to the interpretation of the profiles; they are:

- High scores are better than low scores
- Balanced profiles are better than unbalanced profiles
- Priorities for action are to achieve balance and move upscale

The following examples demonstrate how to use this tool. Each column is rated according to the assessment of the organization's current competency in a specific area and indicates where current effort is at a higher-level and where efforts are least advanced.

Energy Management Matrix





The Energy Management Matrix provides an effective way to gain insight into a company's current approach to energy matters. It can then be used regularly to simplify efforts to identify important energy saving activities that can improve the energy efficiency of your company.

Level	Energy Management Policy	Organization	Underlying Principle	Monitoring, tracking, reporting	Promotion	Investment
4	Energy management policy, action plan, and regular review have commitment of top management as part of an environmental strategy.	Energy management fully integrated into management structure. Clear delegation of responsibility for energy consumption. Energy Committee chaired by board member.	Formal and informal channels of communication regularly exploited by energy manager and energy staff at all levels.	Comprehensive systems set targets, monitor consumption, identify faults, quantify savings, and provide budget tracking.	Marketing the value of energy efficiency and the performance of energy management both within the organization and outside it.	Positive bias in favor of 'green' schemes with detailed investment appraised of all new-building and refurbishment opportunities.
3	Formal energy policy, but no active commitment from top management.	Energy manager accountable to energy committee representing all users.	Energy committee used as main channel together with direct contact with major users.	M&T reports for individual premises are based on submetering. Achieved performance against targets reported effectively to users.	Program of staff awareness and regular publicity campaign.	Same payback criteria employed as for all other investments.
2	Unadopted energy policy set by energy manager or senior department manager.	Energy manager in job, reporting to ad hoc committee, but line management and authority are unclear.	Contact with major users through ad hoc committee chartered by senior departmental manager.	Monitoring and targeting reports based on supply meter data. Energy unit has ad hoc involvement in budget setting.	Some ad hoc staff awareness training.	Investment using short-term payback criteria.
1	An unwritten or uncoordinated set of guidelines.	Energy management is the part-time responsibility of someone with limited authority or influence.	Informal contacts between engineer/technical staff and a few users.	Cost reporting based on invoice detail. Engineer compiles reports for internal use within technical department.	Informal contacts used to promote energy efficiency.	Only low-cost measures taken.
0	No explicit policy.	No energy management or any formal delegation of responsibility for energy consumption.	No contact with users.	No information system. No accounting for energy consumption.	No promotion of energy efficiency.	No investment in increasing energy efficiency in premises.

Based on BRECSU 1993 Energy Management Matrix.

When using the matrices, consider each column individually. Place a mark in each column that best describes the organization's energy performance status. Join the marks across the columns. This will describe the organization's approach to energy management, and provide an overall indication of how well balanced energy management is within the organisation.

The peaks represent where current effort is most sophisticated. The troughs indicate where the company is least advanced. Don't be concerned if the 'line' is uneven; this is not unusual and is the case in most organisations.

The Matrix will identify those aspects where some further attention is required to ensure energy management is developed in a rounded, effective way. It will also assist in organising an energy management system.

Download a copy of Energy management priorities – a self assessment tool or go to the United Kingdom's Best Practice Program for a complete listing of best practices guides.

For additional information on other ways to save energy on a daily basis without having to spend (much) money, go to http://www.energyoffice.org/english/index.html. This site has several useful tools, for example, the Checklists for organizational and user behavior.

Energy Performance Information, Planning & Reporting

Effective energy programs are often "sold" to owners on the basis that they provide benefits directly related to the core mission, that they can be integrated into the current physical plant structure and culture, and broaden the financial perspective beyond the top-line budget evaluations. Project planning tools can be found at the Rebuild America Solution Center and on DOER's Rebuild Massachusetts web page.

There are many ways to identify energy savings opportunities and improve energy performance.

These typically include:

REBUILD AMERICA SOLUTION CENTER PROVIDES INFORMATION ON:

- Low/No Cost Improvements
- Energy Efficiency Retrofit
- Major Renovation
- New Construction
- Community Energy
- Services
- Project Planning Tools

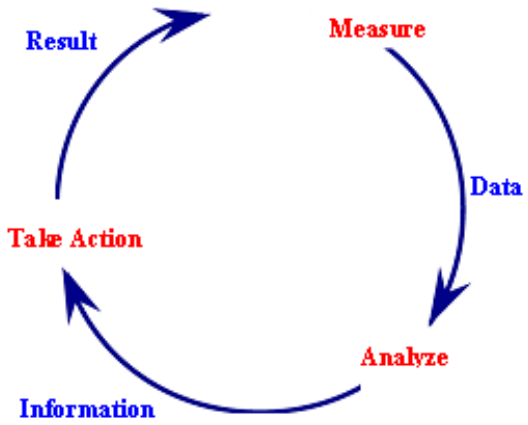
- Energy surveys or audits, involving the physical inspection of buildings and process equipment to identify sources of energy waste and measure efficiency. Use benchmarking results to identify poorest energy performers. Target the poorest performers first to optimize results.

- Employee-focused activities, such as campaigns to increase awareness, motivation and involvement in energy efficiency activities throughout the company. Providing recognition to those who helped the organization achieve these results motivates staff and employees and brings positive exposure to the energy management program.

- Organizational considerations, such as the formulation of policy, the assignment of energy responsibilities, the provision of training, etc. The scope of performance goals can include multiple levels of the organization as well as various time periods for completion of specific goals.

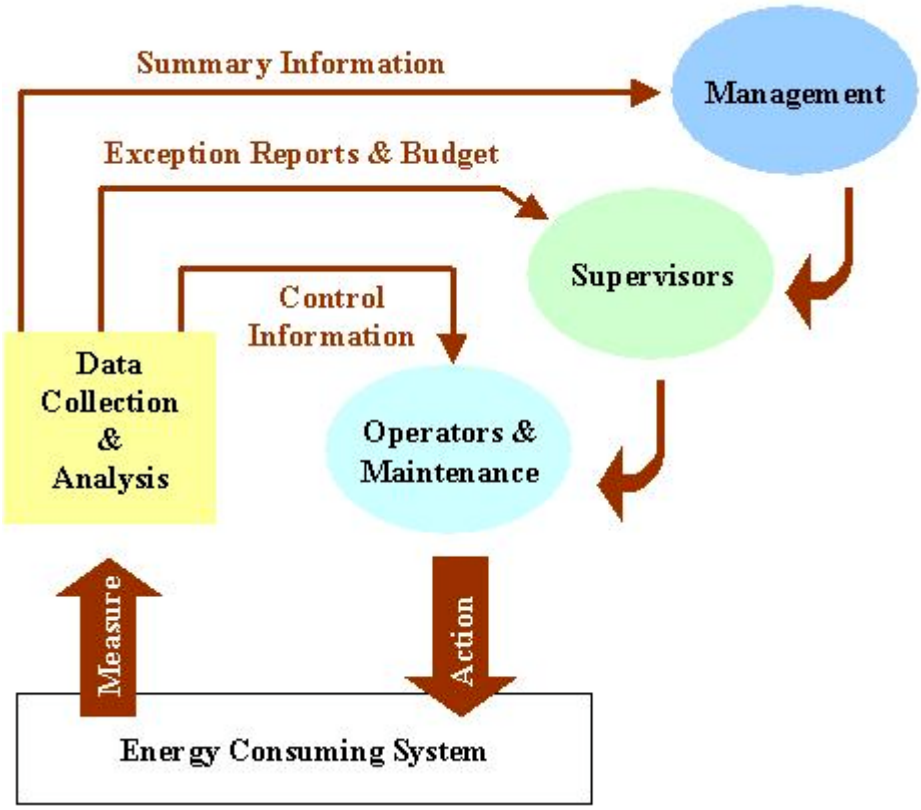
- Facility and process retrofits, incorporating more efficiency technology. U.S. Department of Energy Rebuild America solution center provides a library of technologies and systems design for retrofits, major renovations, and new construction.

- Revisions to operational and maintenance practices.



Energy performance information is essential for energy management. Monitoring, targeting and reporting (MT&R) provides useful information on performance improvement measures that have been implemented, even to the point of assessing the return on investment in terms of savings achieved. It is a management tool for ongoing performance control and improvement.

A reporting mechanism exists to put the right information in the right hands at the right time. The following figure summarizes the information flow cycles for operations and management and demonstrates the level of detail needed by different stakeholders based on their standing and impact on performance.



To communicate strategically, you need to identify key audiences, determine the information that they need, and adapt your messages appropriately for each one. Using a plan to guide the organization's communications efforts to target its diverse audiences results in more clear, coordinated, memorable, and effective messaging.

Municipal Resource Management

SEVEN STEPS TO PROGRAM SUCCESS:

STEP 1 Create an Energy Task Force

Select: Task Force Leader
Staff
Community/ Board members

STEP 2 Review and Approve Program

Develop: Program Design (templates for evaluation)
Partnerships
Budget (template for budget)
Funding Sources
Timeline (template for timeline)

STEP 3 Identify and Award Utility Monitoring and Support Services

Select: Energy Information System
Resource Efficiency Manager

STEP 4 Review and Analyze Efficiency Opportunities

Review: Utility Procurement Options
Utility System Benefit Charge Measures
Alternative Finance Measures
Building Commissioning
Efficiency Awareness

STEP 5 Identify and Award Projects

Award: Alternative Finance Measure Contract(s)
Utility System Benefit Charge Contract(s)
Utility Procurement Contract(s)

STEP 6 Manage Projects

Manage: Alternative Finance Measure Contract(s)
Utility System Benefit Charge Contract(s)
Utility Procurement Contract(s)

STEP 7 Monitor and Verify Project Performance

Monitor: Alternative Finance Measure Contract(s)
Utility System Benefit Charge Contract(s)
Utility Procurement Contract(s)
Resource Efficiency Manager
Building Commissioning
Efficiency Awareness